

Nikon

**IC Inspection Microscope
ECLIPSE L200 / ECLIPSE L200D**

Instructions

Thank you for purchasing the Nikon products.

This instruction manual is written for the users of the Nikon's IC inspection microscope "ECLIPSE L200 / ECLIPSE L200D" and describes the basic operations of the microscope.

To ensure correct usage, read this manual carefully before operating the instrument.

- **It is prohibited to reproduce or transmit this manual in part or whole without Nikon's expressed permission.**
- **The contents of this manual are subject to change without notice.**
- **Although every effort has been made to ensure the accuracy of this manual, if you note any points that are unclear or incorrect, contact your nearest Nikon representative.**
- **Some of the products described in this manual may not be included in the set you have purchased.**
- **Be sure to read the instruction manual for any other products used in combination with the microscope.**

Warning / Caution Symbols Used in This Manual

Although Nikon products are designed to provide you with the utmost safety during use, incorrect usage or disregard of the instructions can cause personal injury or property damage. For your safety, read the instruction manual carefully and thoroughly before using the instrument. Do not discard this manual but keep it near the product for easy reference.

In this manual, safety instructions are indicated with the symbols shown below. Be sure to follow the instructions indicated with these symbols to ensure correct and safe operation.

Symbol

Meaning



WARNING

Disregarding instructions marked with this symbol may lead to death or serious injury.



CAUTION

Disregarding instructions marked with this symbol may lead to injury or property damage.

Meaning of Symbol Used on the Equipment

Symbol

Meaning



Caution for heat.

This marking near the lamphouse calls your attention on the following;

- Lamphouse becomes very hot during and immediately after the illumination.
- Risk of burns. Do not touch the lamphouse during and immediately after the illumination.
- Make sure that the lamphouse is sufficiently cool before the lamp replacement.



WARNING

1 Intended product use.

This microscope should only be used for microscopic observation. Do not use it for any other purpose. Do not observe such a large sample as to stick out of the stage.

2 Do not disassemble.

Disassembly may cause malfunction, electrical shock and/or injury. Do not disassemble any part other than those described in this manual. If you experience any problem with the microscope, notify your nearest Nikon representative.

3 Power cord.

To prevent electrical shock, always turn off the power switch (flip it to the ○ side) before connecting or disconnecting the power cord. Use only the supplied power cord. Using the wrong power cord could result in damage or fire. (The specification of the supplied power cord is written below.)

Also note that the protection Class 1 equipment should be connected to PE (protective earth) terminal.

- **For 100 to 120V AC area:**

UL Listed, detachable power cord set, 3 conductor grounding Type SVT, No.18 AWG, 3 m long maximum, rated at 125V AC minimum.

- **For 220 to 240V AC area:**

Approved according to EU/EN standards, 3 conductor grounding Type H05VV-F, 3 m long maximum, rated at 250V AC minimum.

4 Heat from the light source.

The lamp and the lamphouse become extremely hot. To avoid burns, do not touch the lamphouse while the lamp is lit or for thirty minutes after it has been turned off.

Further more, in order to avoid the risk of fire, do not place fabric, paper or highly flammable volatile materials such as gasoline, petroleum benzine, paint thinner or alcohol near the lamphouse while the lamp is lit or for about thirty minutes after it has been turned off.

The rear of the microscope also become hot during use. Although this is not a malfunction, be careful not to touch.

5 Reflection.

The polished surface of the sample will reflect strong light by the illumination. Do not observe the illuminated surface for a long time because the strong reflection may hurt your eyes.



CAUTION

1 Check the light source.

Use only the specified lamp and the lamphouse on this microscope. The use of other lamps and lamphouses may lead to malfunction.

- **The specified lamphouse:**
12V-100W halogen epi-lamphouse made by Nikon
(model: Nikon LHS-H100P-2 HALOGEN 12V 100W)
- **The specified lamp:**
12V-100W LONGLIFE halogen lamp
(model: OSRAM HLX 64623 or PHILIPS 7724)

2 Cautions on lamp replacement.

- To prevent burn injury, allow the lamp to cool for at least 30 minutes after turning off the power switch, before replacing the lamp.
- To prevent electrical shock and damage to the microscope, always turn off the power switch (flip it to the ○ side) and unplug the power cord from the wall outlet before connecting or disconnecting the lamphouse.
- Do not touch the glass surface of the lamp with bare hands. Fingerprints or grease on the bulb surface will degrade the illuminating capacity of the lamp. Wipe clean the fingerprints or grease with a clean piece of cloth.
- Securely attach the lamphouse cover to the lamphouse after replacing the lamp.
Never light the lamp while the lamphouse cover is open.

3 Do not wet the microscope.

If the microscope gets wet, a short circuit may result that may cause malfunction or abnormal heating of the microscope. If you accidentally spill a liquid on the microscope, immediately turn off the power switch (flip to the ○ side) and unplug the power cord from the wall outlet. Then use a dry cloth to wipe away the moisture. If any liquid gets inside the microscope, do not use it; instead, notify your nearest Nikon representative.

4 Weak electromagnetic waves.

This microscope emits weak electromagnetic waves. The accuracy of any precision electronic equipment may be adversely affected if positioned too close. If the microscope affects TV or radio reception, move the radio or TV further away from the microscope.

5 Installation location.

This product is a precision optical instrument. Using or storing the microscope under unsuitable conditions may damage it or may have an adverse effect on its accuracy. The following conditions should be kept in mind when selecting the installation location.

- Avoid a brightly lit location such as a room that receives direct sunlight, or directly under room lights. The image quality deteriorates if there is excessive ambient light.
- Choose a location that is free from dust or dirt.
- Choose a flat surface with little vibration.
- Choose a sturdy desk or table that is able to bear the weight of the instrument.
- Do not install the microscope in a warm, humid location .
- Take enough space around the microscope referring to the layout diagrams on the next page.
- The **installation conditions** are as follows:
 - Area required: 710 mm (W) x 920 mm (D) or more
 - Power source: 100 to 240V AC \pm 10% (2.4 A)
 - Operating environmental temperature:
+5° to +35°C
 - Weight of the microscope:
Approx. 45 kg (including stage and eyepiece tube)

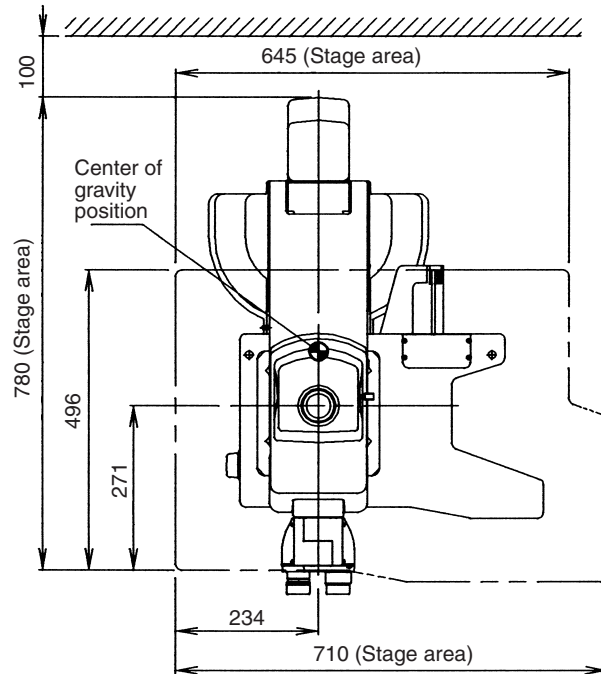
6 Cautions on moving the microscope.

- The microscope is a precision optical instrument. Handle it carefully and do not subject it to a strong physical shock.
- When moving the microscope, first remove the stage. Then, hold the microscope by two or more people from both sides of the microscope.
(Information) The main body of the L200/L200D weighs approx. 30 kg.
With the eyepiece tube, lamphouse and other parts (except stage) attached, the microscope weighs approx. 35 kg.
- Do not hold the focusing knobs, eyepiece tube, lamphouse, stage mount, breath shield plate, etc., when carrying the microscope. They may come off and may cause serious injury or malfunction.
- Ask your nearest Nikon representative for the carrying rods of the microscope.
- Before carrying the stage, attach the fixing metals to hold the movement of the stage plate.
- Be careful not to pinch your fingers or hands when moving the microscope.

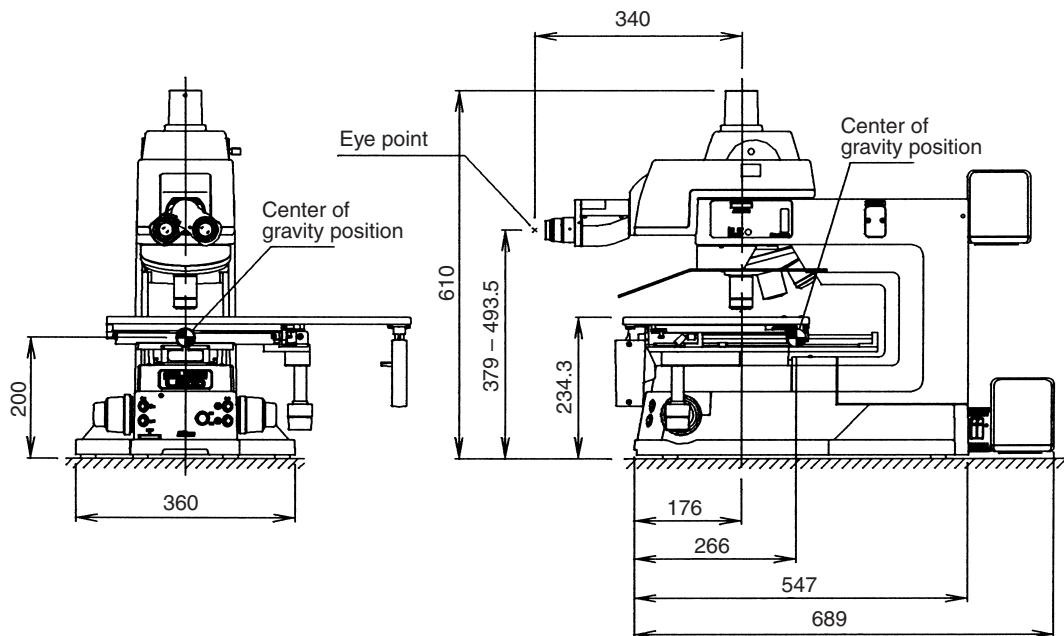
7 Cautions on assembling the microscope.

- Be careful not to pinch your fingers or hands during the assembly.
- The scratches or fingerprints on the lens surface will adversely affect the microscope image. Be careful not to scratch or touch the lens surfaces.

LAYOUT DIAGRAMS



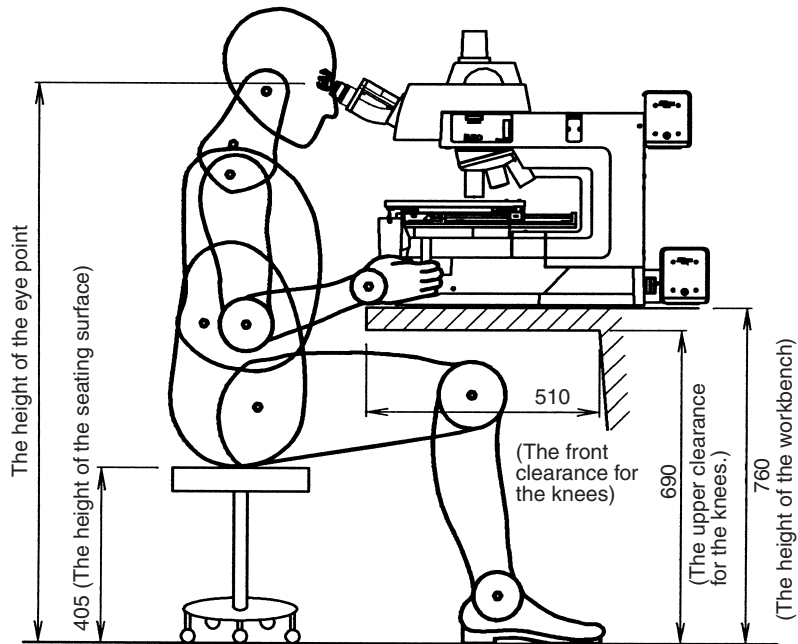
< Operator space >



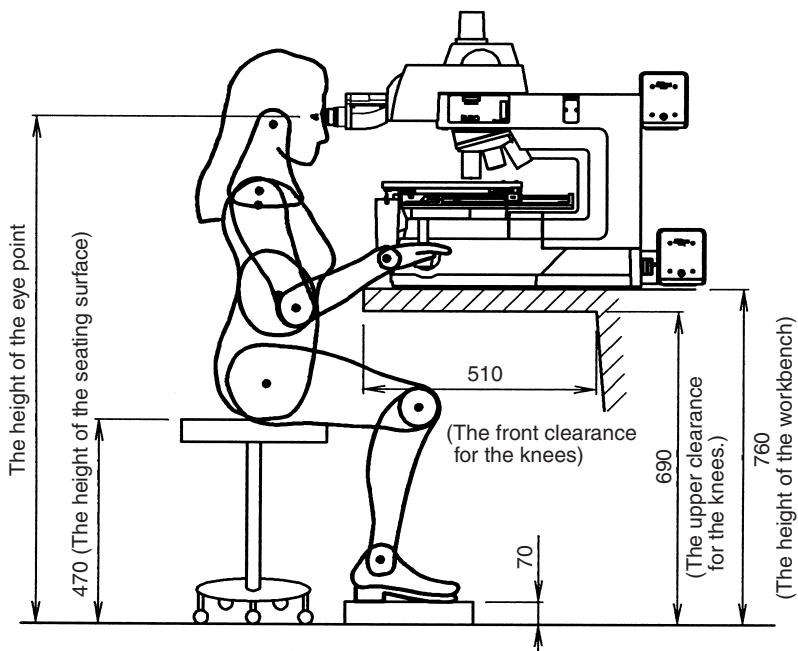
OPERATING POSTURE

The figure below shows the operation posture that prevents strain on your body. Choose a workbench and a chair having the similar dimensions to those shown on the figure.



The 95th percentile male (Height: 189.5 cm)



The 5th percentile female (Height: 147.5 cm)

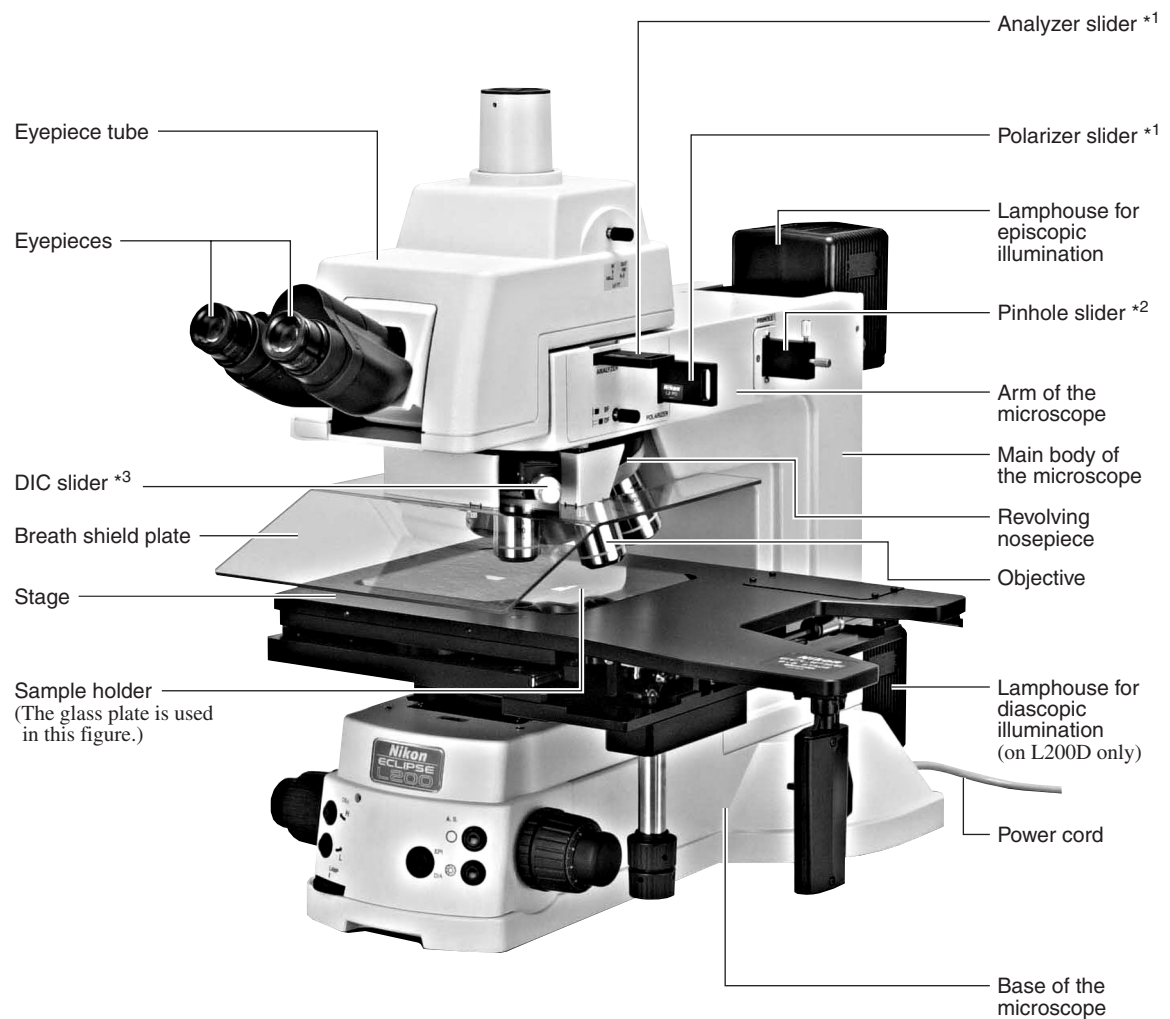


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I Nomenclature and Functions

1 Names of the parts

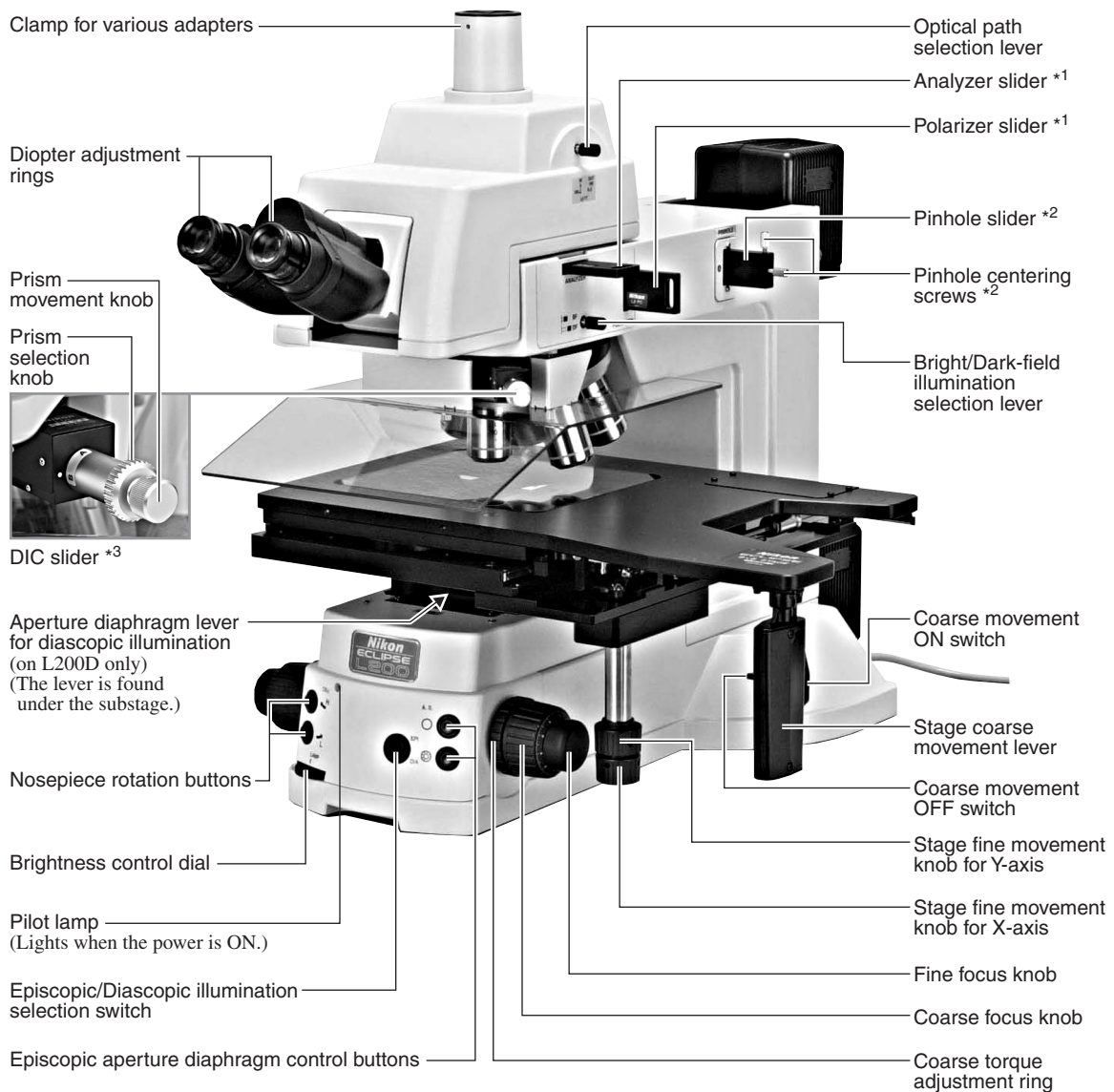


*1: For DIC microscopy or episcopic bright-field simplified polarization microscopy.

*2: For pinhole microscopy.

*3: For DIC microscopy.

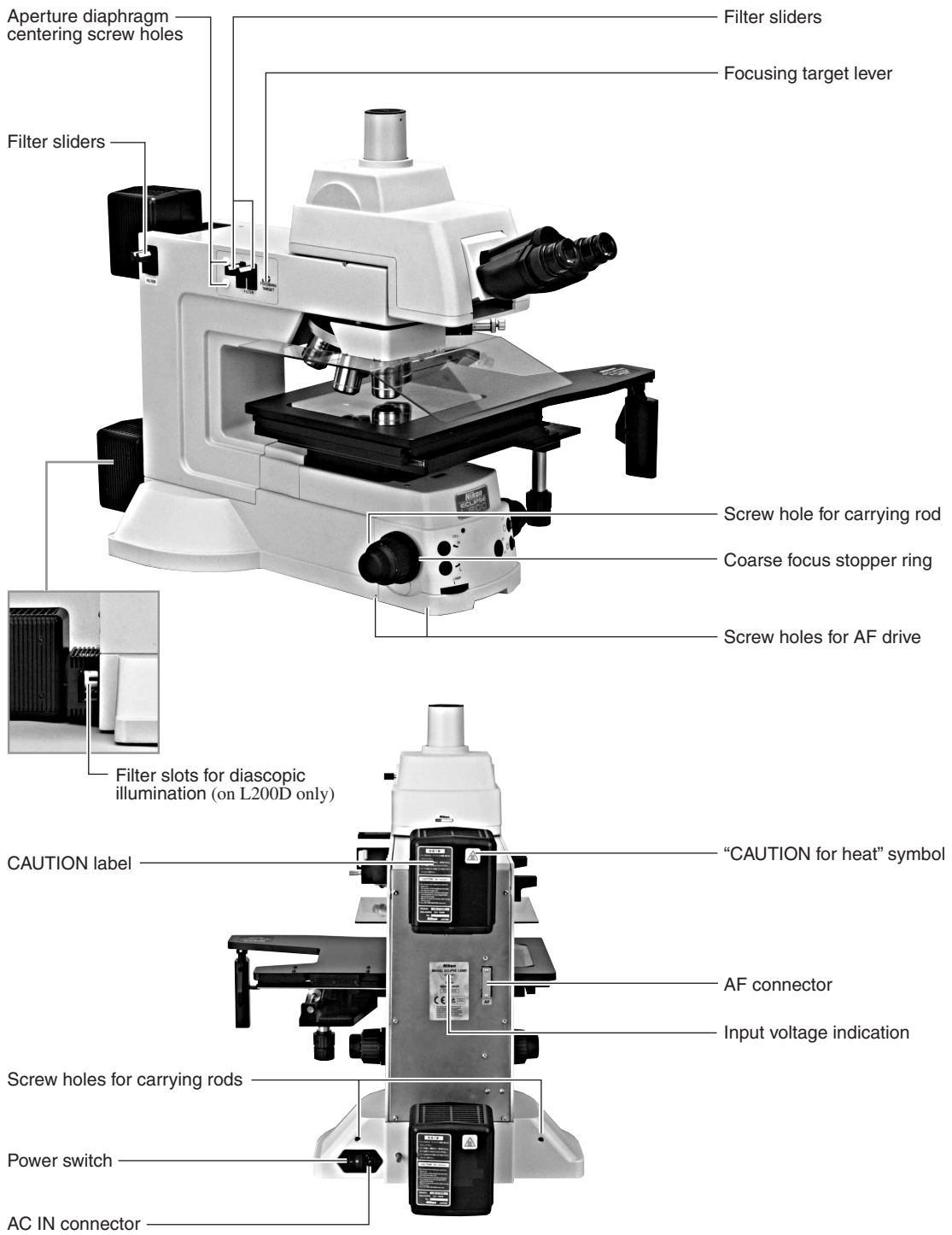
2 Names of the operational parts



*1: For DIC microscopy or episcopic bright-field simplified polarization microscopy.

*2: For pinhole microscopy.

*3: For DIC microscopy.



II Microscopy

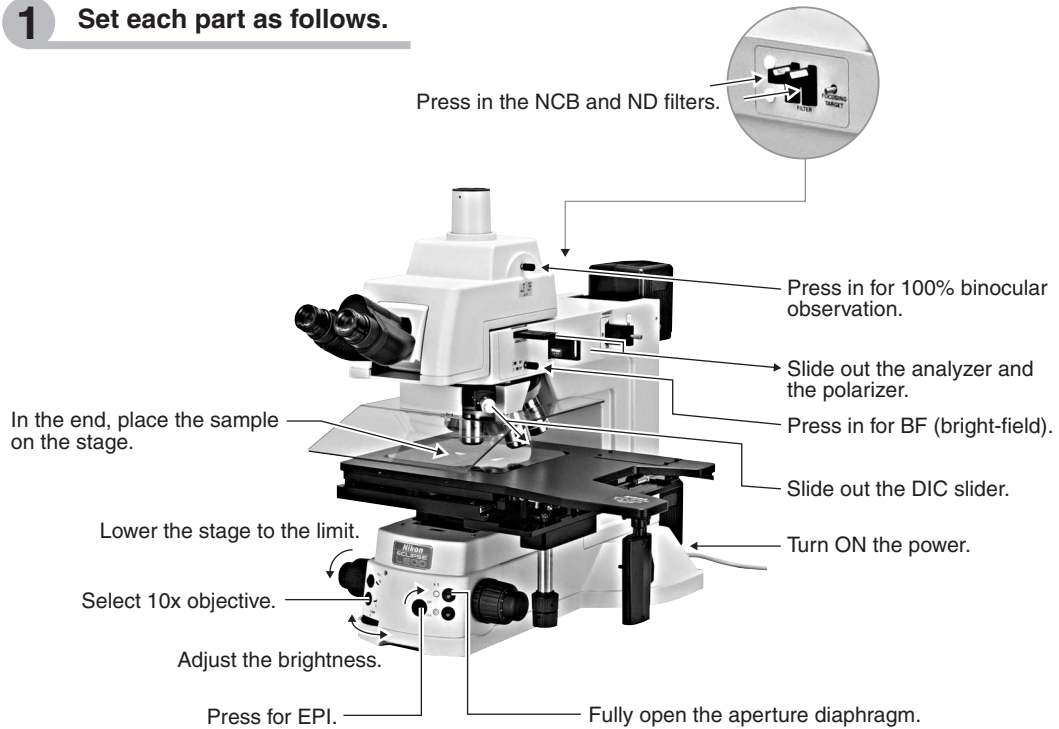
In this chapter, each microscopy is described individually.

Please also refer to the chapter “ **III** Operation of Each Part” for how to operate each part.

- 1** Episcopic bright-field microscopyP.5
- 2** Episcopic dark-field microscopyP.6
- 3** Episcopic DIC (differential interference contrast) microscopy.....P.7
- 4** Episcopic bright-field simplified polarization microscopyP.8
- 5** Diascopic bright-field microscopy (for L200D only)P.9

1 Episcopic bright-field microscopy

1 Set each part as follows.



2 Focus on the sample.

P.16

Use the focusing target for easy focusing.

3 Adjust diopter.

P.13

4 Adjust interpupillary distance.

P.13

5 Switch to the desired objective and focus on the sample again.

6 Adjust brightness.

P.2 P.10

Use the ND filters and brightness control dial.

7 Adjust the size of the aperture diaphragm.

P.14

2 Episcopic dark-field microscopy

1 Mount the BD objectives.

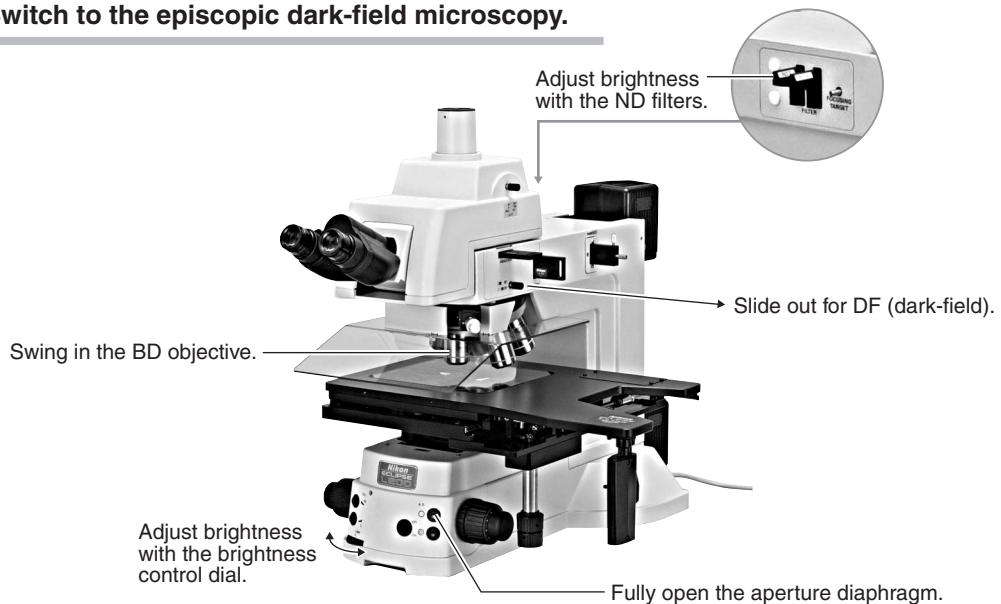
Note) Only the objectives marked "BD" can be used on the dark-field microscopy.



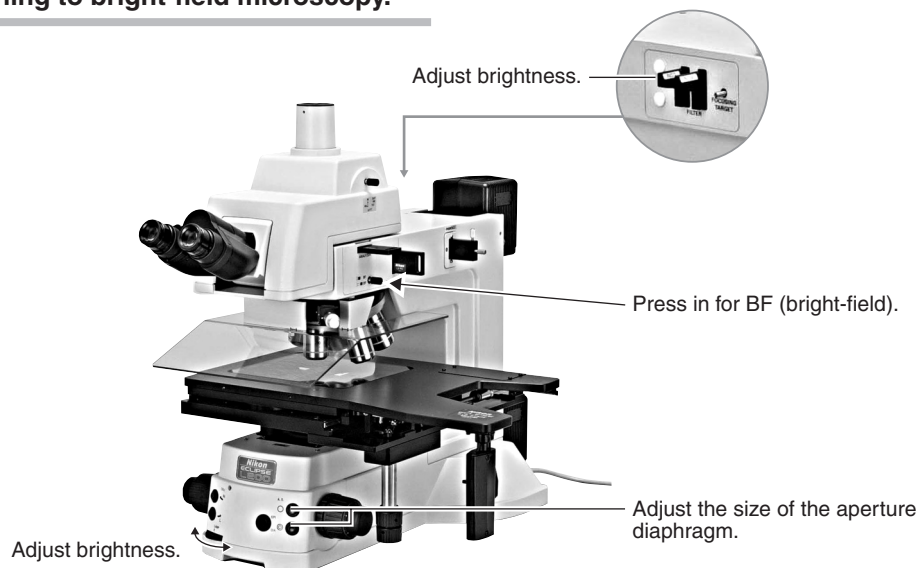
BD marking on the objective

2 Observe the sample with the episcopic bright-field microscopy. P.5

3 Switch to the episcopic dark-field microscopy.



4 Returning to bright-field microscopy.



3 Episcopic DIC (differential interference contrast) microscopy

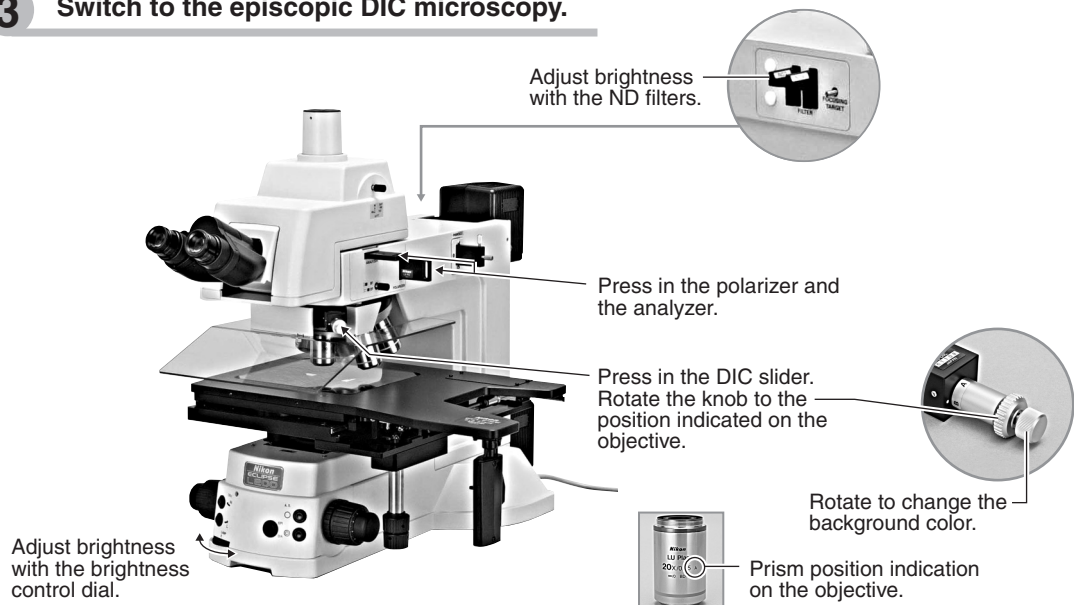
1 Attach the polarizer, analyzer and DIC sliders.

The objective with "LU" marking is suitable for DIC microscopy.

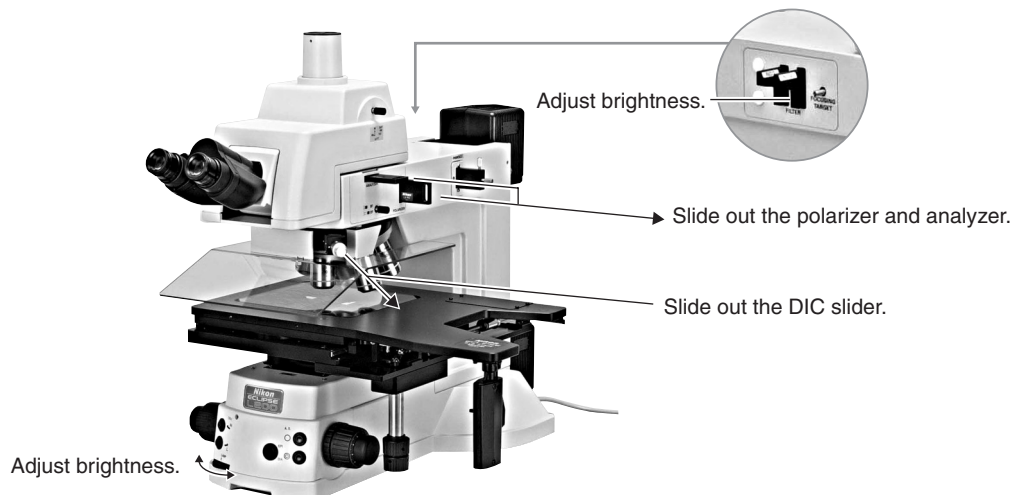
2 Observe the sample with the episcopic bright-field microscopy.

 P.5

3 Switch to the episcopic DIC microscopy.



4 Returning to bright-field microscopy.



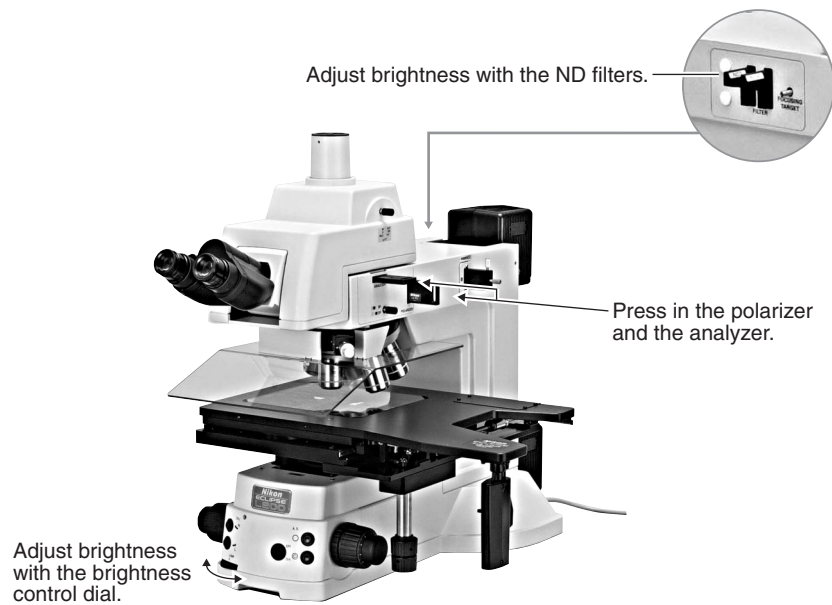
4 Episcopic bright-field simplified polarization microscopy

1 Attach the polarizer and analyzer.

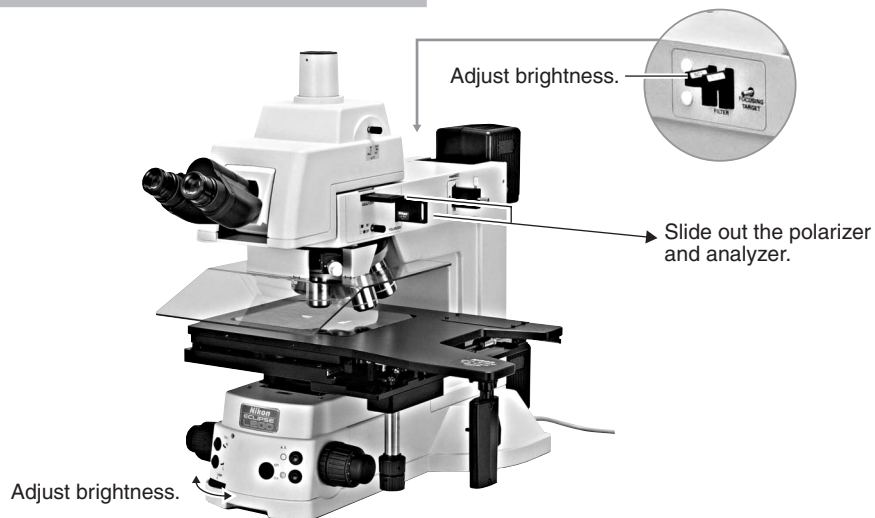
2 Observe the sample with the episcopic bright-field microscopy.

 P.5

3 Switch to the episcopic bright-field polarization microscopy.

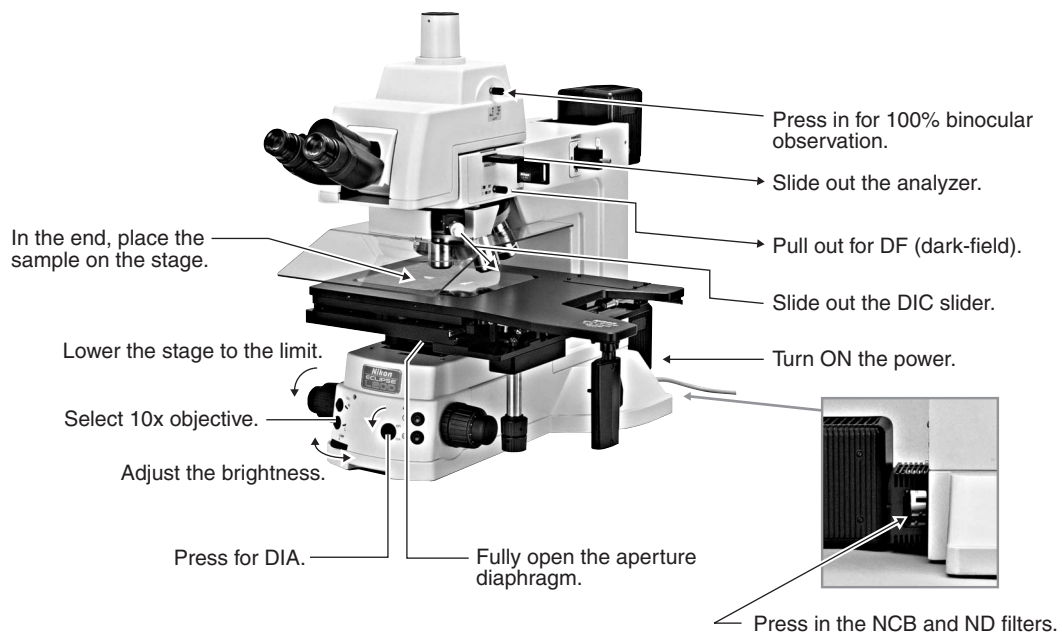


4 Returning to bright-field microscopy.



5 Diascopic bright-field microscopy (for L200D only)

1 Set each part as follows.



2 Focus on the sample.

The focusing target cannot be used for diascope illumination.

3 Adjust diopter.

P.13

4 Adjust interpupillary distance.

P.13

5 Switch to the desired objective and focus on the sample again.

6 Adjust brightness.

Use the ND filters and brightness control dial.

P.2 P.10

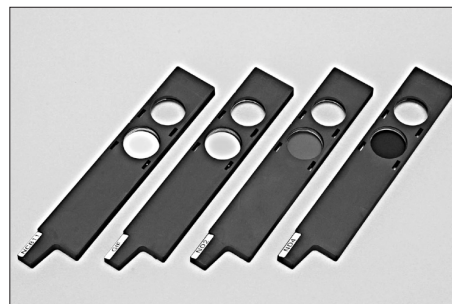
7 Adjust the size of the aperture diaphragm.

P.14

III Operation of Each Part

1 Filters

There are four filter slots at the left side of the microscope arm. For L200D, there are two more filter slots in front of the lamphouse for diascopic illumination. The types and usage of the filters are as follows.



Filters	Usage
NCB (neutral color balancing filter)	Color balance adjustment for general use and color photomicrography
ND4 (transmission rate: 50%)	Brightness adjustment.
ND16 (transmission rate: 6%)	Brightness adjustment.
GIF (green interference filter)	Contrast adjustment.

▶ Placing the filter in and out of the optical path

You feel two clicks as you slide the filter slider in and out of the microscope. Press in the slider to the second click, to insert the filter in the optical path. Slide out to the first click to remove the filter from the optical path.

2 Coarse / fine focus knobs

▶ The relationship between the focus knob rotation and the stage vertical movement

The relationship between the direction of the focus knob rotation and the stage vertical movement is shown in the figure.

- The stage moves 0.1 mm by one full rotation of the fine focus knob.
- The stage moves 1 μm by one step of the fine focus knob graduations.
- The stroke (range) of the stage vertical movement is 29 mm.

(Reference) When observing with the combination of “8x8 stage” + “8 inch wafer holder” + “0.7 mm thick wafer”, the stage vertical movement range is 16.2 mm up and 12.8 mm down from the focal plane.

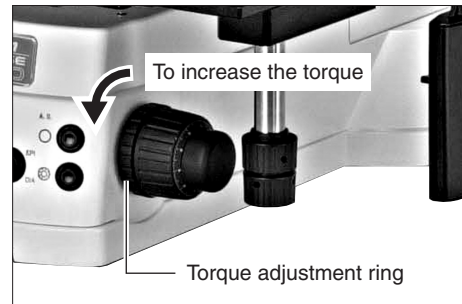


Never attempt either of the following actions. They will damage the microscope.

- Rotating the left and right knobs in opposite directions at the same time.
- Continuing to rotate the coarse focus knob after the stage has reached the limit of its motion.

▶ Adjusting the torque of the coarse focus knob

The torque of the coarse focus knob can be adjusted. To increase the torque, turn the torque adjustment ring counter-clockwise. To reduce the torque, turn it clockwise, but please make sure that the stage does not fall on its own weight when you take your hands off the coarse focus knob.



▶ Coarse focus stopper ring

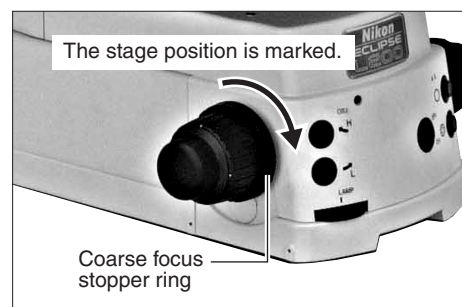
The coarse focus stopper ring is used to mark the vertical position of the stage, mainly the focal plane. Once the coarse focus stopper ring is clamped at a position, you can easily bring back the stage to that position even after it is lowered greatly for sample exchange.

The coarse focus stopper ring is at the back of the left side focus knob. To mark the stage position, turn the ring clockwise to the limit. Then, use only the coarse focus knob to lower or raise the stage for sample exchange.

When the stage is raised to the limit by the coarse focus knob, the stage is back at its marked position. (Please note that when the coarse focus stopper ring is clamped, the stage can no longer be raised up beyond the marked position by the coarse focus knob.)

To release the clamp, turn the coarse focus stopper ring counter-clockwise to the limit.

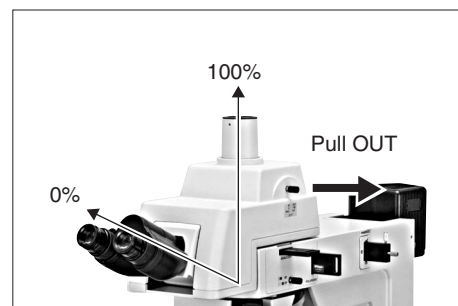
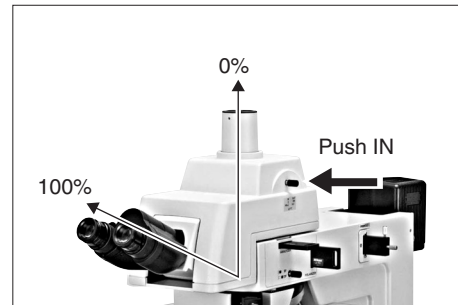
Do not over-tighten the coarse focus stopper ring since it will become difficult to release.



3 Eyepiece tube

▶ Optical path selection

The optical path selection lever can be used to switch the destination of light from the binocular part to the vertical tube.



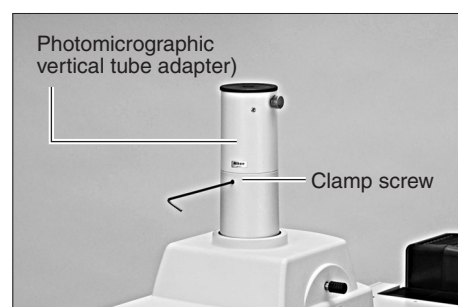
▶ Tilting function

The binocular part of the trinocular tilting eyepiece tube L2-TT can be swung up and down for finding the best position for observation.



▶ Vertical tube adapters

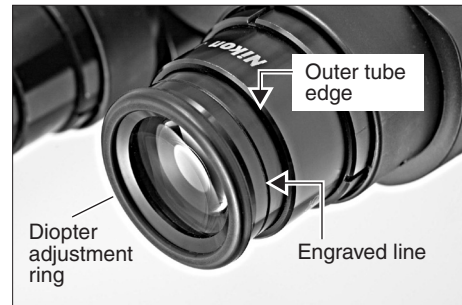
When mounting the photomicrographic equipment or TV camera to the vertical tube of the trinocular eyepiece tube, you must first attach the adapter (photomicrographic vertical tube adapter or direct C-mount; both sold separately). Insert the adapter into the vertical tube and fix it by the clamp screw with the hexagonal screwdriver.



4 Diopter adjustment

The diopter adjustment compensates for differences in eyesight between your left and right eyes. After the correct adjustment, you will find the observation with both eyes easier and the focus shift is reduced when switched to the different objectives. Be sure to adjust the diopter adjustment rings on both eyepieces.

- 1) Turn the diopter adjustment rings on both eyepieces to align their engraved lines with the edge of the outer tube of the eyepiece. (This is the standard position for the diopter adjustment.)
- 2) Focus on the sample with the 10x objective following the steps described on P.5 (or P.9).
- 3) Bring the 50x objective in the optical path and focus on the sample using the focus knobs. (Using the focusing target makes the focusing easier on episcopic illumination.)
- 4) Bring the 5x or 10x objective in the optical path.
- 5) Looking through the right eyepiece with your right eye, focus on the sample by turning the diopter adjustment ring on the right eyepiece (not the coarse and fine focus knobs).
Look through the left eyepiece with your left eye and focus on the sample with the diopter adjustment ring on the left eyepiece.
- 6) Repeat steps 3) to 5) till the image keeps its focus even though the objective magnification is changed.

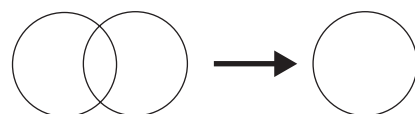


5 Interpupillary distance adjustment

Before adjusting the interpupillary distance, perform the diopter adjustment and focus on the image with the 10x objective.

Adjust the interpupillary distance so that the viewfield for each eye is at the same position on the sample.

Doing so will make observation through the binocular eyepiece with both eyes easier.



Merge the viewfields into one.

6 Aperture diaphragm

About the aperture diaphragm

- The aperture diaphragm adjusts the numerical aperture (N.A.) of the illumination system, and plays an important part in determining image resolution, contrast and depth of focus.
- Generally, the aperture diaphragm is to be stopped down to 70 to 80% of the objective N.A.
- Stopping down the aperture diaphragm excessively will lower the image resolution. The aperture should not be smaller than 60% of the objective N.A.

Adjusting the size of the aperture diaphragm

Remove one eyepiece and look into the open sleeve. Inside, you can see the exit pupil of the objective as a bright circle. You can find the aperture diaphragm image by opening or closing down the aperture diaphragm. Adjust the size of the aperture diaphragm by actually looking to its image. (If your sample is of low reflectance and observed under episcopic illumination, you may not be able to see the aperture diaphragm image. In this case, replace the sample with of higher reflectance.) The size of the aperture diaphragm can be changed in the following way.

- For episcopic illumination: Press either of the episcopic aperture diaphragm control buttons.
- For diascope illumination: Move the aperture diaphragm lever for diascope illumination.

Centering the aperture diaphragm (for episcopic illumination)

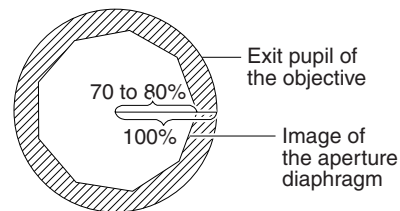
On normal usage, there is no need to center the aperture diaphragm since it is already centered at the factory. If you need very precise centering or off-centered diaphragm (such as for diagonal illumination), the position of the aperture diaphragm can be shifted.

- Tools required: Hexagonal screwdriver (2 mm) x 2

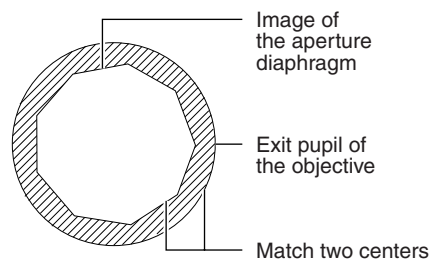
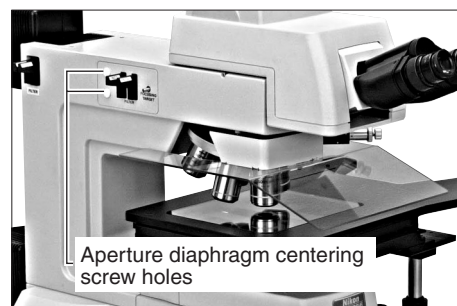
Find the aperture diaphragm centering screw holes at the left side arm of the microscope and remove their caps. Use the hexagonal screwdrivers to turn the centering screws underneath.

Remove one eyepiece from the microscope and look inside the open sleeve to find the image of the aperture diaphragm. Turn the centering screws to bring the image to the very center (or move the image off the center) of the exit pupil of the objective (which can be seen as a bright circle as described in the column explaining how to adjust the size of the aperture diaphragm).

For precise centering, use of centering telescope (sold separately) is recommended with which you can observe the exit pupil of the objective much easier.



The appropriate size of the aperture diaphragm



7 8 x 8 Stage

The 8 x 8 stage can be moved in either the “coarse” mode for swift and long ranged movement, or the “fine” mode for minute movement. To switch between the modes, use the coarse movement ON and OFF switches on the stage coarse movement lever.

► The “coarse” mode

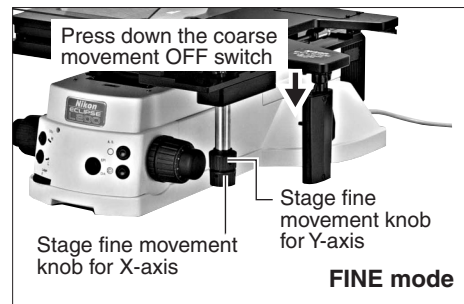
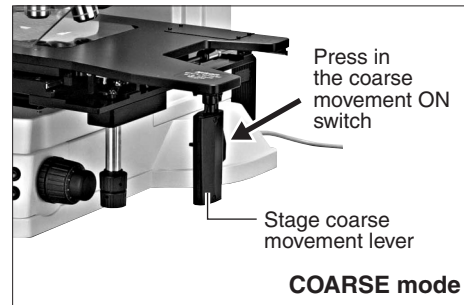
Grip the stage coarse movement lever to press in the coarse movement ON switch at the back side of the lever. The stage is now in the “coarse” mode and can be moved freely in both X and Y direction. Take hold of the stage coarse movement lever when moving the stage. The stage keeps its “coarse” mode until the coarse movement OFF switch at the left side of the lever is pressed down.

Moving the stage with the stage coarse movement lever without pressing in the coarse movement ON switch will damage the stage. Likewise, pushing or pulling the stage plate without pressing in the coarse movement ON switch will damage the stage. Make sure that the coarse movement ON switch is pressed in for the COARSE mode.

► The “fine” mode

Press down the coarse movement OFF switch at the left side of the stage coarse movement lever. The stage is now in the “fine” mode. Turn the stage fine movement knobs to move the stage minutely in both X and Y direction. The fine mode is maintained until you press in the coarse movement ON switch at the back side of the stage coarse movement lever.

- If you are using the motorized stage, please refer to the instruction manual supplied with the motorized stage for its operation.



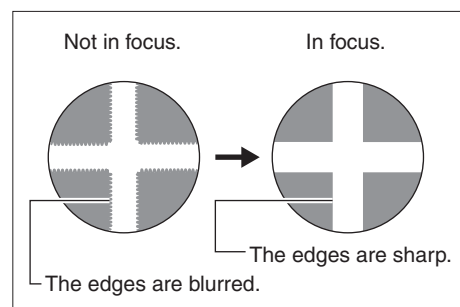
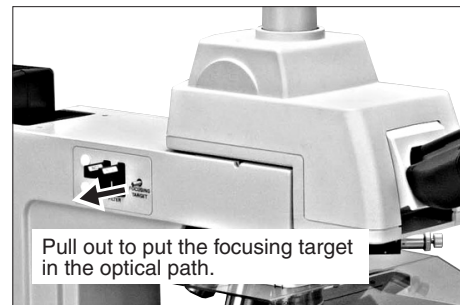
8 Focusing target

When you are to observe a sample with the polished surface under the episcopic illumination, the use of the focusing target will facilitate the focusing.

► How to use the focusing target.

Pull out the focusing target lever to put the focusing target in the optical path. Push in, to remove.

Pull out the focusing target lever and look into the eyepieces. You will find dark shadows at 4 corners of the viewfield. When the sample is not in focus, the edges of the shadows are also blurred (see the figure left). Turn the focusing knobs and focus on the edges of the shadows till they look sharp. Remove the focusing target and find out that the sample is just as well in focus.



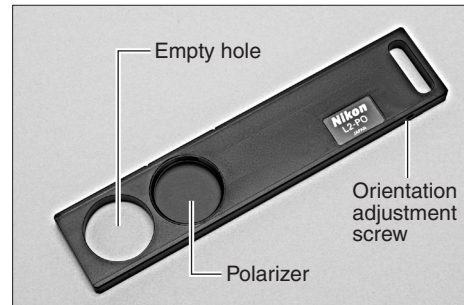
9 Polarizer slider

Use together with the analyzer slider for episcopic bright-field simplified polarization microscopy.

Use together with the analyzer and the DIC sliders for episcopic DIC microscopy.

▶ Attaching the polarizer slider

Remove the cap near the indication “POLARIZER” at the right side of the microscope arm. Insert the polarizer slider with its nameplate facing toward the eyepieces. Slide the slider in and out of the microscope to find two clicks on the slider.



▶ Placing the polarizer in the optical path

Push in the slider till the second click to place the polarizer in the optical path.

Adjust the orientation of the polarizer before using the polarizer for the first time.

(See Adjusting the orientation of the polarizer below.)

▶ Removing the polarizer out of the optical path

Pull out the slider to the first click to remove the polarizer out of the optical path.

(The empty hole is now placed in the optical path.)

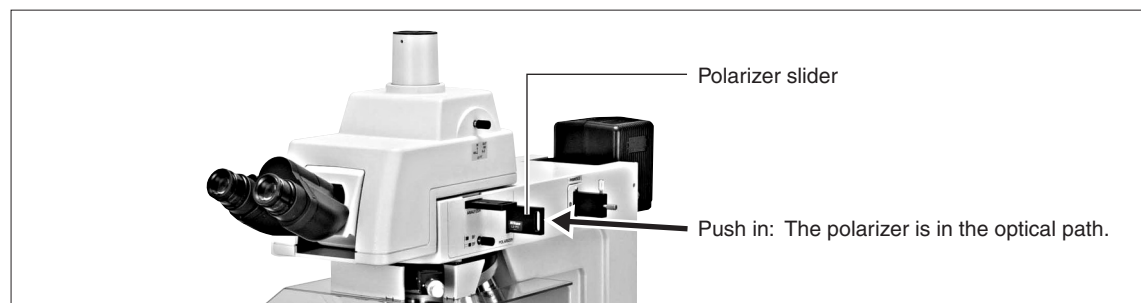
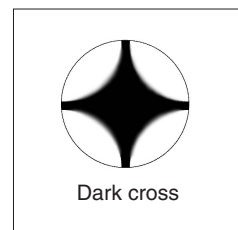
▶ Adjusting the orientation of the polarizer

Turning the orientation adjustment screw at the bottom of the slider changes the orientation of the polarizer. Here is how to rotate the polarizer for the precise crossed Nicols adjustment.

Place the polarizer and the analyzer in the optical path. Place a sample with flat and plane surface on the stage and set each part of the microscope for the episcopic simplified polarization microscopy.

Remove one eyepiece from the microscope and look inside the open sleeve. You can see the objective's exit pupil as a bright circle.

Turn the orientation adjustment screw in either direction till the dark cross appears in the viewfield. This is the crossed Nicols position.



10 Analyzer slider

Use together with the polarizer slider for episcopic bright-field simplified polarization microscopy.

Use together with the polarizer and the DIC sliders for episcopic DIC microscopy.

▶ Attaching the analyzer slider

Remove the cap near the indication “ANALYZER” at the right side of the microscope arm. Insert the analyzer slider with its nameplate facing up. Slide the slider in and out of the microscope to find two clicks on the slider.

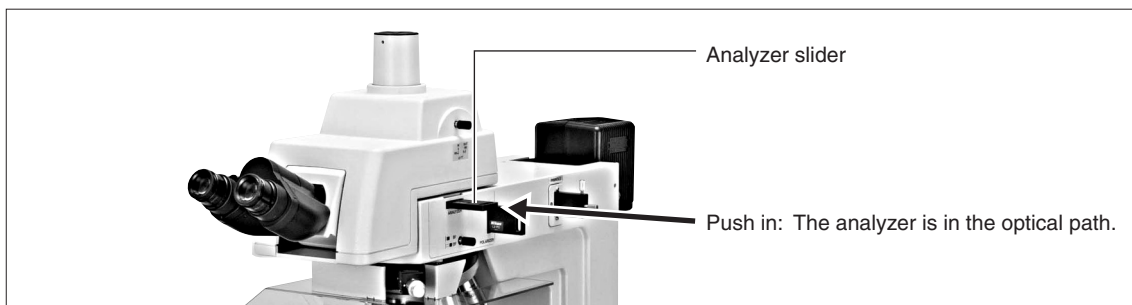
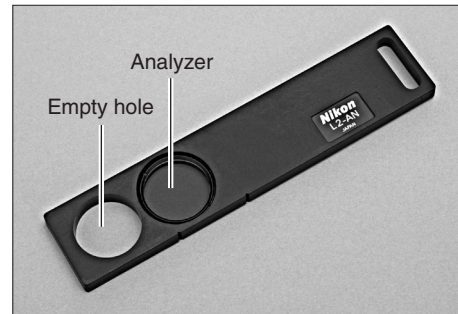
▶ Placing the analyzer in the optical path

Push in the slider till the second click to place the analyzer in the optical path.

Since the orientation of the analyzer is already adjusted at the factory, you can easily get the crossed Nicols position by just placing the polarizer and the analyzer in the optical path.

▶ Removing the analyzer out of the optical path

Pull out the slider to the first click to remove the analyzer out of the optical path. (The empty hole is now placed in the optical path.)



11 DIC slider

Use together with the polarizer and the analyzer sliders for episcopic DIC microscopy.

▶ Attaching (removing) the DIC slider

Use a hexagonal screwdriver to loosen the DIC slider limit screw on the revolving nosepiece.

Insert the DIC slider into the slot on the nosepiece and screw in the DIC slider limit screw.

When removing the DIC slider from the nosepiece, first fully loosen the DIC slider limit screw, and then pull out the slider.

▶ Placing the DIC prism in the optical path

Push in the slider till the second click to place the DIC prism in the optical path.

▶ Removing the DIC prism out of the optical path

Pull out the slider to the first click to remove the DIC prism out of the optical path.

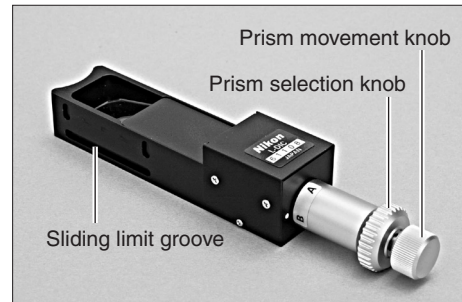
▶ Selecting the DIC prism position

According to the objective in use, select either A or B as the position of the DIC prism. The correct position to be used is indicated on the objective barrel after the magnification and the objective N.A. indications. See the objective figure on the right. The letter "A" on the barrel indicates that the correct DIC prism position for this objective is "A". Thus, when you use this objective, turn the prism selection knob on the DIC slider to match the letter "A" with the white dot.

▶ Selecting the interference color

Turn the prism movement knob to change the interference colors.

Interference color	Effects
Dark	Observation similar to the dark-field microscopy can be performed.
Gray	The changes in phase difference are shown as the difference in brightness. This color gives the highest sensitivity in detecting the phase difference.
Sensitive red-violet	The changes in phase difference are shown as a difference in interference colors. The detection sensitivity is not good as the gray.



The correct position for the prism selection knob is indicated here.

12 Pinhole slider

When using the high magnification objectives, placing the pinhole on the optical path gives deep depth of focus to the image. This is especially effective when observing the contact holes.

▶ Attaching the pinhole slider

Remove the cover plate near the indication “PINHOLE” at the right side of the microscope arm. Attach the pinhole slider adapter instead, using two flat head screws supplied together with the pinhole slider. Insert the pinhole slider to the adapter. Slide the slider in and out of the microscope to find two clicks on the slider.

Be sure to center the pinhole before observation.

▶ Placing the pinhole in the optical path

Push in the slider till the second click to place the pinhole in the optical path.

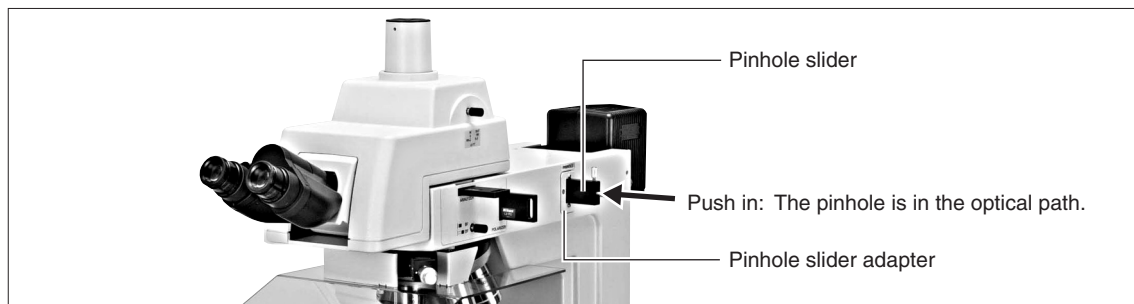
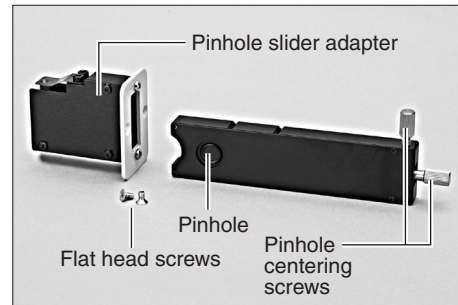
When the pinhole is in the optical path, opening or closing down the aperture diaphragm will have no effect on the image since the pinhole aperture is smaller than the aperture diaphragm stopped down to the limit.

▶ Removing the pinhole out of the optical path

Pull out the slider to the first click to remove the pinhole out of the optical path and to make the aperture diaphragm effective.

▶ Centering the pinhole

Be sure to center the pinhole (match the centers of the pinhole and the optical path) before observation. Remove one eyepiece and while looking into the open sleeve, turn the pinhole centering screws to bring the pinhole image to the center of the exit pupil of the objective. For this adjustment, the use of centering telescope (sold separately) is recommended since it will facilitate the observation of the exit pupil.



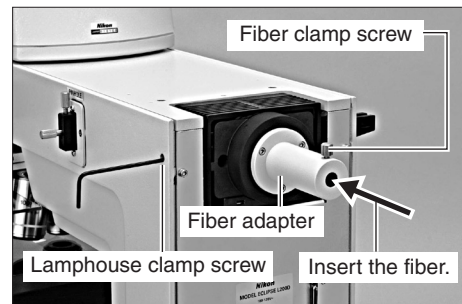
13 Fiber adapter

Attaching the fiber adapter instead of the episcopic lamphouse will enable the user to use the illuminator with the fiber luminous section.

▶ Attaching the fiber adapter

Loosen the lamphouse clamp screw to remove the episcopic lamphouse. Insert the fiber adapter instead and fix it by the same clamp screw.

Insert the fiber to the adapter to the limit and fix it by the fiber clamp screw.



14 Breath shielding plate

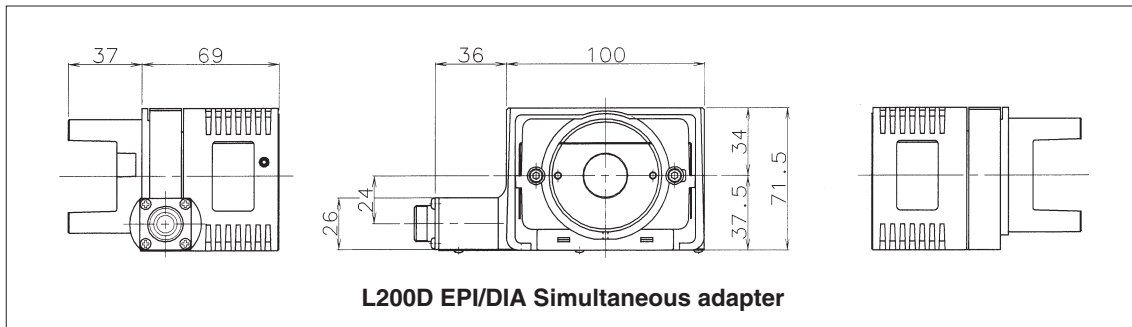
There are three screw holes for mounting the breath shielding plate under the front bottom side of the arm near the nosepiece. Screw on the breath shielding plate to the microscope by screwing in the screws on the breath shielding plate.

The excessive loading on the transparent plastic plate such as to bend the plate may break the plate. Please be careful in handling.



15 L200D EPI/DIA Simultaneous adapter

If you are using L200D and wishes to turn on the EPI and DIA illumination at the same time, use the “L200D EPI/DIA simultaneous adapter”.



Attach the simultaneous adapter in between the diascope lamphouse and the lamphouse mount at the rear bottom of the microscope main body and connect it to the Power Supply UN2 using the lamp cable supplied with the adapter.

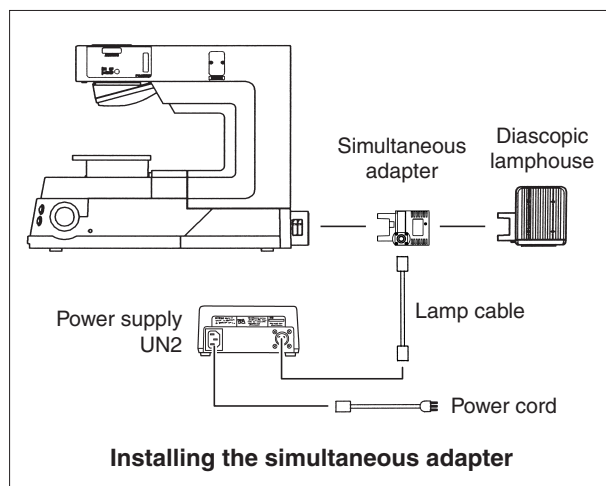
To turn ON and OFF, and to adjust the brightness of the diascope illumination, use the switches on the Power Supply UN2.

(The simultaneous adapter shuts the power from the microscope main body to the diascope lamphouse. Even when the Episcopic/Diascopic illumination selection switch is turned down to DIA, diascope illumination will not light.)

Also refer to the instruction manual supplied with the Power Supply UN2.

► How to install the simultaneous adapter

- 1) Insert the simultaneous adapter to the lamphouse mount at the rear bottom of the microscope main body. Fix it with the clamp screw using the hexagonal screwdriver.
- 2) Attach the lamphouse to the simultaneous adapter. Securely fit the plug of the lamphouse to the socket on the adapter.
- 3) Connect the adapter to the OUTPUT connector of the Power Supply UN2 using the lamp cable supplied with the adapter.
- 4) Connect the power cord to the Power Supply UN2.

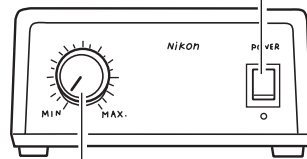


Power switch

Before turning on the power, confirm that the input voltage shown on the rear panel matches the voltage that you will be using. If not the same, do not use this power supply.

Flip the switch to the "I" side to turn on the power; the switch lamp should light when the power is on.

Flip the switch to the "O" side to turn off the power.



Front panel

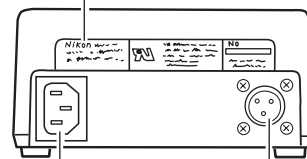
Light intensity control dial

This dial adjusts the lamp brightness.

Rating label

Before turning on the power, confirm that the input voltage shown here matches the voltage that you will be using. If not the same, notify your nearest Nikon representative.

(If you use the instrument with the wrong input voltage, it may be damaged.)



Rear panel

OUTPUT connector

This is the lamp output connector.

Connect the lamp cable from the compatible lamphouse (or microscope) to this connector.

AC input connector

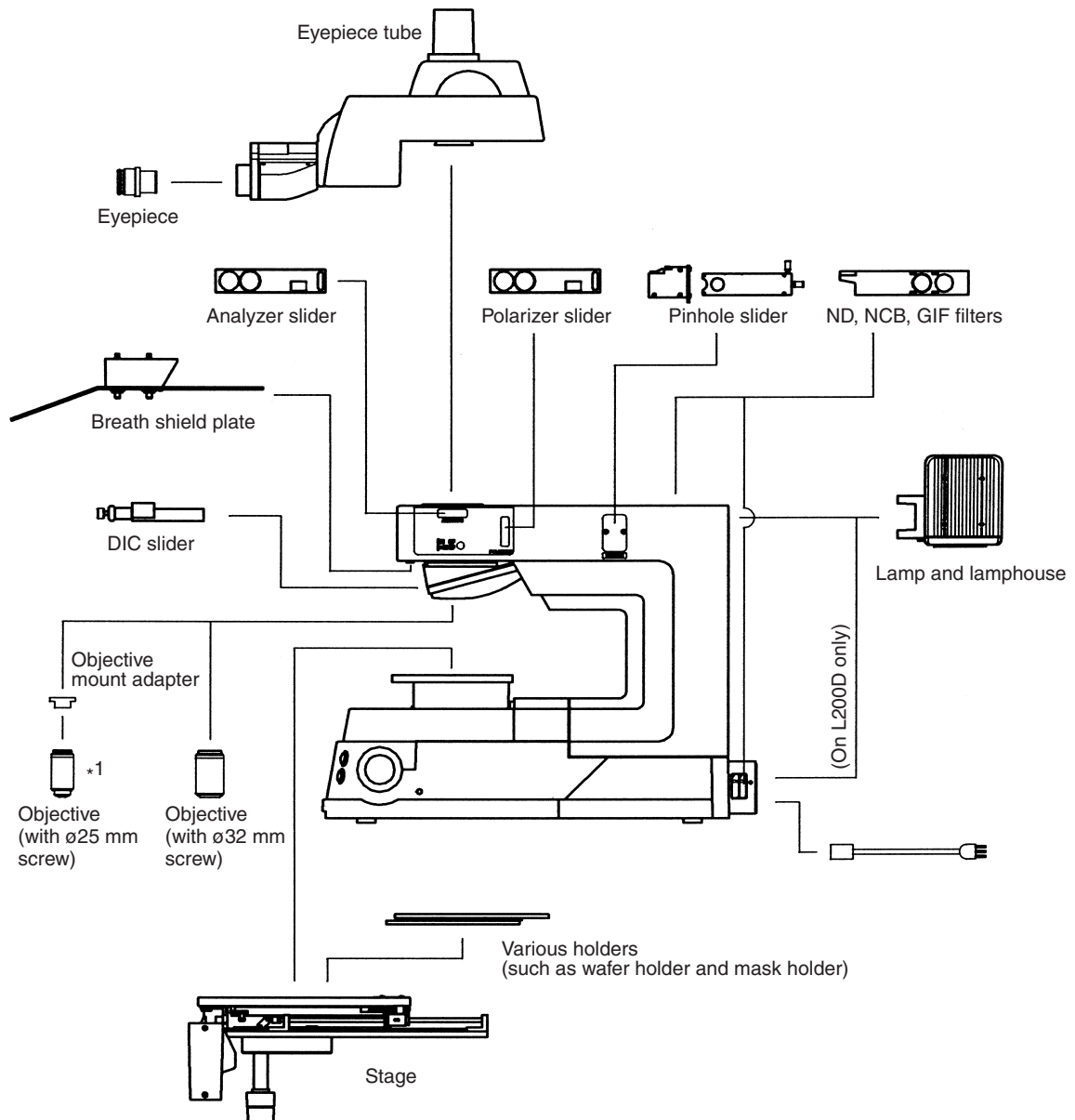
Connect the socket of the power supply cord to this connector.

Plug in the other end of the cord to an AC power outlet with a ground (earth) conductor.

Power supply UN2

(See the instruction manual supplied with the power supply for details.)

► Assembling the ECLIPSE L200 / L200D



*1: Needs objective mount adapter to change the screw from $\varnothing 25$ to $\varnothing 32$ mm.

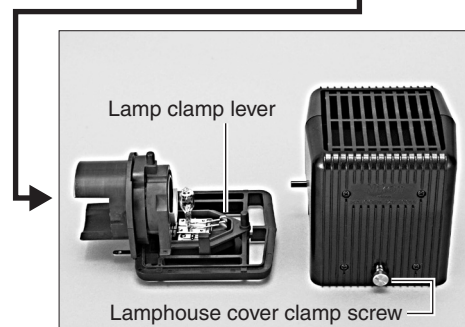
1 Attaching the lamp and the lamphouse (replacing the lamp)



CAUTION

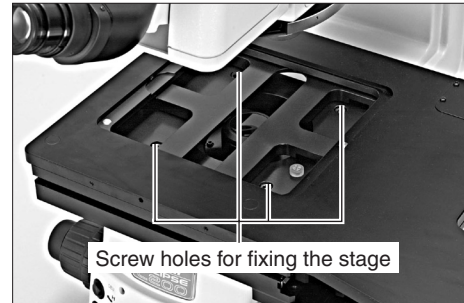
- To prevent electrical shock and damage to the microscope, always turn off the power switch (flip it to the ○ side) and unplug the power cord from the wall outlet before connecting or disconnecting the lamphouse.
- To prevent burn injury, allow the lamp and the lamphouse to cool for at least 30 minutes after turning off the power switch, before replacing the lamp.
- Use the “LHS-H100P-2 HALOGEN 12V100W” lamphouse manufactured by Nikon.
- Use the 12V-100W LONGLIFE halogen lamp (OSRAM HLX 64623 or PHILIPS 7724).
- Do not touch the glass surface of the lamp with bare hands. Fingerprints or grease on the bulb surface will degrade the illuminating capacity of the lamp. Wipe clean the fingerprints or grease with a clean piece of cloth.
- Securely attach the lamphouse cover to the lamphouse after replacing the lamp. Never light the lamp while the lamphouse cover is open.

- 1) Turn off the power switch of the microscope (flip it to the ○ side).
- 2) Remove the lamphouse from the microscope if attached. (Use the 2 mm hexagonal screwdriver to loosen the lamphouse clamp screw on the right side of the microscope and remove the lamphouse.)
- 3) Remove the lamphouse cover by loosening the lamphouse cover clamp screw by a coin.
- 4) Press down the lamp clamp lever and insert a lamp to the socket to the limit. (Do not hold the lamp by the bare hands. Use gloves.)
- 5) Slowly return the lamp clamp lever to its original position. Take care not to tilt the lamp at this time.
- 6) Securely close the lamphouse cover and tighten the clamp screw.
- 7) Return the lamphouse to the microscope. Make sure that the plug on the lamphouse fits securely into the socket on the lamphouse mount.



2 Attaching the stage and the holder

- 1) Lower the substage to the limit with the coarse focus knob.
- 2) Place the stage on the substage and fix it by four M6 screws (supplied together with the substage) using the 5 mm hexagonal wrench.
- 3) Remove the fixing metals from the stage plate using 3 mm hexagonal wrench. The fixing metals are attached to the stage with four hexagonal screws.
- 4) Place the holder on the stage matching three claws on its bottom with the three claws on the stage. Fix the holder with the clamp screw at the left side of the stage taking care not to lift up the holder by tightening the clamp screw too much.



3 Attaching the eyepiece tube

Fully loosen the eyepiece tube fixing screw with the hexagonal screwdriver. Fit the eyepiece tube on to the mount on the top of the microscope arm and tighten the eyepiece tube clamp screw.

▶ **When removing the eyepiece tube**

Take hold of the eyepiece tube when loosening the eyepiece tube clamp screw since the eyepiece tube may drop suddenly.

4 Attaching the objectives

Lower the stage to the limit. Screw in the objectives to the nosepiece so that their magnification become higher in the order of the nosepiece addresses of 1 to 6. The objectives of $\varnothing 25$ mm and $\varnothing 32$ mm screws can be attached to the nosepiece. But please note that the $\varnothing 25$ mm objectives need objective mount adapters to change their screws to $\varnothing 32$ mm.

▶ **When removing the objectives**

To avoid breaking the objectives and the sample, first lower the stage to the limit and remove the sample on the stage. Then remove the objective using both hands so that the objective will not drop suddenly.

▶ **When the objectives not set correctly on the optical path when they are switched**

When the objectives not set correctly on the optical path when they are switched, turn the revolving nosepiece several times. After these several turns, the objectives will be set correctly on the optical path. This trouble may happen when the objectives on the nosepiece is few, and set on one side of the nosepiece.

5 Attaching the eyepieces

Attach the eyepieces of the same magnifications for the left and the right eyes.

There is a positioning pin on the eyepiece sleeve. Insert the eyepiece so that its positioning groove matches the pin .

6 Connecting the power cord



WARNING

Use only the supplied power cord. Using the wrong power cord could result in damage or fire. (The specification of the supplied power cord is written below.)

Also note that the protection Class 1 equipment should be connected to PE (protective earth) terminal.

- **For 100 to 120V AC area:**

UL Listed, detachable power cord set, 3 conductor grounding Type SVT, No.18 AWG, 3 m long maximum, rated at 125V AC minimum.

- **For 220 to 240V AC area:**

Approved according to EU/EN standards, 3 conductor grounding Type H05VV-F, 3 m long maximum, rated at 250V AC minimum.

Turn off the power switch of the microscope (flip it to the ○ side).

First connect the socket of the power cord to the AC IN connector on the microscope. Then plug in the plug of the power cord to the AC outlet.

7 Attaching the photomicrographic equipment or the TV camera

Please refer to the instruction manual supplied with each equipment for its operation and assembly.

▶ Photomicrographic equipment

Remove the cap on the vertical tube of the trinocular eyepiece tube and attach the photo adapter. Insert the PL projection lens deep into the photo adapter and then attach the photomicrographic equipment on the photo adapter. Face the finder to the front and tighten the clamp screw.

▶ Photo-mask eyepiece

The use of photo-mask eyepiece (sold separately) is recommended to take photographs maintaining the normal operating posture since without this eyepiece, you must look into the finder on the photomicrographic equipment. See the instruction manual supplied with the photomicrographic equipment (U-III, H-III, P-III) for the use of photo-mask eyepiece.

V Troubleshooting

Improper use of the microscope may adversely affect its performance even though there is no damage on the microscope. If any of the problems listed below arise, take the countermeasures indicated.

1 Viewing and control systems

Troubles	Causes	Countermeasures
Vignetteing in the viewfield. Uneven brightness in the viewfield. Entire viewfield cannot be seen.	Lamp is not installed correctly.	Install it correctly. (P.25)
	DIC, analyzer and polarizer sliders in the intermediate position.	Press in or pull out to the click stop. (P.17 to 19)
	Optical path selection lever is not positioned correctly.	Press in the lever for 100% binocular part. (P.12)
	Optical path selection lever is set for 100% vertical tube.	
	Filter sliders are not positioned correctly.	Slide in or out the sliders correctly. (P.10)
	Bright/dark-field illumination selection lever is not positioned correctly.	Push in or pull out the lever to the limit. (P.2)
	Focusing target lever in the intermediate position.	Push in to the limit.
Dirt or dust in the viewfield.	Aperture diaphragm stopped down too far.	Open it to the appropriate size. (P.14)
	Dirt or dust on the lenses, eyepieces, filters and the sample.	Clean them. (P.32)
	Dirt or dust on the condenser lens (for diasopic illumination).	
Inferior image (contrast too high or low) (low resolution)	Dirt or dust on the lenses, eyepieces, filters and the sample.	Clean them. (P.32)
	Wrong type of objective is used.	Use the objectives marked “L Plan”, “LU Plan” or “L Plan Apo”.
	Aperture diaphragm stopped down too far.	Open it to the appropriate size. (P.14)

Troubles	Causes	Countermeasures
Image is partially dim. Image moves while being focused.	Sample not securely fit on the stage.	Fit the sample securely on the stage.
	Stage tilted.	Mount the stage correctly. (P.25)
Image tinged yellow.	NCB11 filter not used.	Place the NCB11 filter in the optical path. (P.10)
	Lamp voltage too low.	Adjust the brightness by the brightness control dial.
Image too bright.	Lamp voltage too high.	Adjust the brightness by the brightness control dial. (P.2) Or, use ND filters (P.10)
Dark image. (Also refer to the troubles and countermeasures on “2. Electrical”.)	Lamp voltage too low.	Adjust the brightness by the brightness control dial. (P.2)
	Aperture diaphragm stopped down too far.	Open it to the appropriate size. (P.14)
Objective hits the sample when switched from low to high magnification. Sample is out-focused by objective switching.	Eyepiece diopter not adjusted.	Adjust the diopter. (P.13)
	Eyepieces not mounted correctly.	Mount them correctly (match the positioning pin and the groove.) (P.26)
No smooth switching of the objectives.	Objectives attached only to the one side of the nosepiece.	Turn the nosepiece for several times with the nosepiece rotation buttons. (P.26)
Sample does not move smooth.	Sample holder not fixed on the stage correctly.	Fix the sample holder correctly. (P.26)
Viewfields do not merge into one when observed with both eyes.	Interpupillary adjustment not correctly adjusted.	Adjust the interpupillary distance. (P.13)
	Eyepiece diopter not adjusted.	Adjust the diopter. (P.13)

Troubles	Causes	Countermeasures
Eye fatigue.	Interpupillary adjustment not correctly adjusted.	Adjust the interpupillary distance. (P.13)
	Eyepiece diopter not adjusted.	Adjust the diopter. (P.13)
	Improper brightness.	Adjust the brightness by the brightness control dial, or by placing ND filters in the optical path. (P.10)
Heavy coarse focus knobs.	Coarse torque adjustment ring tightened too much.	Adjust the torque. (P.11)
Stage falls on its own weight and the image is out-focused.	Coarse torque adjustment ring loosened too much.	Adjust the torque. (P.11)
No interference colors seen on DIC microscopy.	Analyzer or polarizer not in the optical path.	Put them in the optical path. (P.17 to 18)
	DIC prism not in the optical path.	Put it into the optical path. (P.19)
	Analyzer or polarizer slider inserted in the wrong direction.	Insert them into the microscope in correct direction. (P.17 to 18)
Uneven interference colors on DIC microscopy. Low contrasted colors.	Wrong type of objective is used.	Use the objectives marked “LU Plan” or “LU Plan Apo”.
	Wrong combination of objective and DIC prism position.	Turn the prism selection knob to the position specified by the objective. (p.19)

2 Electrical

Troubles	Causes	Countermeasures
Lamp does not light when switched on.	No electricity. (Power cord not connected.)	Connect the power cord. (P.27)
	No lamp installed.	Install the lamp. (P.25)
	Lamp is blown.	Replace the lamp. (P.25)
	Episcopic/Diascopic illumination selection switch not set correctly.	Switch it correctly.
	Specified lamp not used.	Use the specified lamp. (P.24)
Lamp flickers. Unstable brightness.	Lamp about to blow.	Replace the lamp. (P.25)
	Power cord or lamphouse not connected securely.	Connect them securely. (P.25, 27)
	Lamp not securely inserted in the socket.	Insert securely into the socket. (P.25)

VI Care and Maintenance

1 Cleaning the lens

Do not let dust, fingerprints, etc., get on the lenses. Dirt on the lenses, filters, etc., will adversely affect the view of the image. If any of the lenses get dirty, clean them as described below.

- Either brush away dust with a soft brush, or else wipe it away gently with gauze.
- Only if there are fingerprints or grease on a lens, dampen a piece of soft, clean cotton cloth, lens tissue, or gauze with absolute alcohol (ethyl or methyl alcohol) and wipe.
- Absolute alcohol is highly flammable. Be careful when handling it, when around open flames, when turning the power switch on / off, etc.
- Follow the instructions provided by the manufacturer when using absolute alcohol.

2 Cleaning the painted, plastic and printed parts

Do not use organic solvents (such as alcohol, ether, or paint thinner) on painted, plastic or printed parts. Doing so could result in discoloration or in the peeling of printed characters. Use of a silicon cloth is recommended.

3 Storage

Store the microscope in a dry place where mold is not likely to form.

Store the objectives and eyepieces in a desiccator or similar container with a drying agent.

Put the vinyl cover over the microscope to protect it from dust.

Before putting on the vinyl cover, turn off the power switch on the microscope (flip it to the ° side) and wait until the lamphouse is cool.

4 Regular inspections

Regular inspections of this microscope are recommended in order to maintain peak performance.

Contact your nearest Nikon representative for details about regular inspections.

VII Electrical Specifications

Input rating	Input voltage:	100 to 240 V AC \pm 10%, 50/60 Hz
	Rated current:	2.4 A or less
	Built in fuse rating:	250 V, T4 A
	Power cord:	Use only the following power supply cord. Using the wrong power cord could result in danger or fire. The protection Class 1 equipment should be connected to PE (protective earth) terminal. *UL Listed, detachable power cord set, 3 conductor grounding Type SVT, No.18 AWG, 3 m long maximum, rated at 125V AC minimum. *Approved according to EU/EN standards, 3 conductor grounding Type H05VV-F, 3 m long maximum, rated at 250V AC minimum.

Lamp rating	12 V DC, 100 W halogen lamp (OSRAM HLX 64623 or PHILIPS 7724)
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Protection class	Class 1
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Operating environmental conditions

Temperature:	+5° to +35°C
Humidity:	85% RH max., non-condensing
Altitude:	2000 m max.
Pollution:	Degree 2
Installation category (Overvoltage category):	Category 2
Indoor use only	

Conforming standards

- This model satisfies SEMI guidelines.
- This model satisfies the UL standard.
- This model satisfies FCC 15B Class A.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la Classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

- This model satisfies the EU Low Voltage Directive.
- This model satisfies the EU EMC Directive.

